SECOND GRADE MATHEMATICS

# GRADE LEVEL CONTENT EXPECTATIONS

**2 MATH**

v.6.04

NUMBER & OPERATIONS

ALGEBRA

MEASUREMENT

GEOMETRY

DATA & PROBABILITY

***Welcome to a preview of Michigan's mathematical future! This document not only introduces Michigan's new Grade Level Content Expectations for mathematics, it also establishes high expectations in mathematics to better prepare all K-12 Michigan students for the challenges of the future.***

Creating grade-level expectations involves a complex combination of understanding of mathematics, curriculum, student learning, teaching, current practices, and policy. Curriculum directors, mathematics educators, and classroom teachers from Michigan school districts across the state, together with mathematics and mathematics education faculty from universities across the state, have been involved in the development and/or review of the **Michigan Mathematics Grade Level Content Expectations.** The GLCE are intended to be usable as a framework for the development of grade-by-grade assessments, and to provide teachers with a guide for their instructional and curricular emphases in classrooms. The expectations were constructed to feature continuity from one grade to the next, and to ensure coherence both mathematically and pedagogically. These expectations represent a challenge toward which to aspire; in some cases, teachers and mathematics educators will be called on to move beyond their current practice and experience into territory that will be both demanding and rewarding. Michigan students can rise to the challenge of high academic standards. This document provides a set of ambitious goals for all of us.

**This document is intended to be an assessment tool.** This means students will be expected to be proficient in the concepts and skills included in this document at the end of the indicated grade level. These expectations are written to convey intended performances by students. The expectations here generally represent key landmarks in mathematics learning — areas where students are expected to have consolidated their understandings and skills. Thus it does not attempt to elaborate all of the precursor ideas and concepts that lead to a particular expectation in a particular grade level — it instead assumes that teachers will build up to the expectations through exploration and development of concepts and processes

The Grade Level Content Expectations are not designed to be a curriculum document, or to function as a scope and sequence framework. It is not designed to suggest the various pedagogical options and strategies that might best enable students to attain these expectations. Rather, it should serve as a basis for the development of a curriculum and instructional strategies that would help the students attain the concepts and skills necessary to meet the GLCE. Various groups are being organized

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to develop clarification documents, content examples, more elaborated explanations, and suggestions for professional development that would support these expectations. Ultimately, teachers, school personnel and district leaders will need to collaborate and draw on their own professional wisdom and experience, as well as on research, to decide how best to organize instruction to help their students meet these expectations.

**The mathematics content expectations have been organized into five strands: Number and Operations, Algebra, Geometry, Measurement, and Data and Probability**.

These expectations are being presented in two formats; one designed to show specific grade level expectations and a second to show how the expectations transition from one grade level to the next. In the **grade level** format the expectations are organized first by the five strands. Each of the strands is then broken down into content pieces titled "Topics" in an attempt to cluster related ideas for teaching continuity. Under each "Topic" are listed the expectations.

The second format is a "**cross-grade**" version, which has been designed with the intent that one grade level can be easily compared with another and to highlight the mathematical growth that is envisioned across the grades. This format also has been organized into the five strands. However, each strand has been subdivided into broader, more conceptual groupings called "Domains," to allow for cross grade comparison of the expectations. In several of the strands, the "domains" are similar to the "standards" in *Principles and Standards for School Mathematics* from the National Council of Teachers of Mathematics. In the "cross-grade" version, some key expectations are "cross-listed" in grey when they seem especially crucial to the development of another strand. For instance, several strands from the Number and Operations strand are also listed in grey in the Algebra strand.

Although this organization does not include what have typically been called "process" strands, the importance of mathematical process in the development of these proficiencies cannot be underestimated. Embedded within these expectations are emphases on representation, problem solving, and reasoning as appropriate. The importance of making mathematical connections is conveyed through the cross listing. Finally, the process of communication is foundational to all of mathematics learning.

With the cooperation of all those involved in the education of Michigan students, we can enable our young people to attain the highest standards – and thereby open doors for them to have fulfilling and successful lives in a quantitatively and technologically complex future.

## SECOND GRADE

**Second graders continue with more sophisticated work in addition and subtraction of whole numbers, and begin conceptual development of multiplication and division, grounded in contexts and modeled using concrete objects. Teachers can emphasize the inverse relationships between addition and subtraction, and multiplication and division. Children will be using strategies and algorithms, to compute using whole numbers. Simple ideas about fractions are introduced. In geometry, children continue to learn about geometric shapes and their elements.**

## NUMBER AND OPERATIONS

### Count, write, and order whole numbers

**N.ME.02.01** Count to 1000 by 1's, 10's and 100's starting from any number in the sequence.

**N.ME.02.02** Read and write numbers to 1000 in numerals and words, and relate them to the quantities they represent.

**N.ME.02.03** Compare and order numbers to 1000; use the symbols > and <.

**N.ME.02.04** Count orally by 3's and 4's starting with 0, and by 2's, 5's and 10's starting from any number.

### Understand place value

**N.ME.02.05** Express numbers up to 1000 using place value, e.g., 137 is 1 hundred, 3 tens, and 7 ones; use concrete materials.

### Add and subtract whole numbers

**N.FL.02.06** Decompose 100 into addition pairs, e.g., 100 = 99 + 1 = 98 + 2…

**N.MR.02.07** Find the distance between numbers on the number line, e.g., how far is 79 from 26?

**N.MR.02.08** Find missing values in open sentences, e.g., 42 + □ = 57; use relationship between addition and subtraction.

**N.MR.02.09** Given a contextual situation that involves addition and subtraction for numbers up to two digits,: model using objects or pictures, explain in words, record using numbers and symbols; solve.

**N.FL.02.10** Add fluently two numbers up to two digits each, using strategies including formal algorithms; subtract fluently two numbers up to two digits each.

**N.FL.02.11** Estimate and calculate the sum of two numbers with three digits that do not require regrouping.

**N.FL.02.12** Calculate mentally sums and differences involving: three-digit numbers and ones; three-digit numbers and tens; three-digit numbers and hundreds.

### Understand meaning of multiplication and division

**N.MR.02.13** Understand multiplication as the result of counting the total number of objects in a set of equal groups, e.g., 3 x 5 gives the number of objects in 3 groups of 5 objects, or 3 x 5 = 5 + 5 + 5 = 15.

**N.MR.02.14** Represent multiplication using area and array models.

**N.MR.02.15** Understand division (÷) as another way of expressing multiplication, using fact families within the 5 x 5 multiplication table; emphasize that division "undoes" multiplication, e.g., 2 x 3 = 6 can be rewritten as 6 ÷ 2 = 3 or 6 ÷ 3 = 2.

**N.MR.02.16** Given a simple situation involving groups of equal size or of sharing equally, represent with objects, words, and symbols; solve.

**N.FL.02.17** Develop strategies for fluently multiplying numbers up to 5 x 5.

### Work with unit fractions

**N.ME.02.18** Recognize, name, and represent commonly used unit fractions with denominators 12 or less; model 1/2, 1/3, and 1/4 by folding strips.

**N.ME.02.19** Recognize, name, and write commonly used fractions: 1/2, 1/3, 2/3, 1/4, 2/4, 3/4.

**N.ME.02.20** Place 0 and halves, e.g., 1/2, $1^1/_2$, $2^1/_2$, on the number line; relate to a ruler.

**N.ME.02.21** For unit fractions from 1/12 to 1/2, understand the inverse relationship between the size of a unit fraction and the size of the denominator; compare unit fractions from 1/12 to 1/2.

**N.ME.02.22** Recognize that fractions such as 2/2, 3/3 and 4/4 are equal to the whole (one).

## MEASUREMENT

### Measure, add, and subtract length

**M.UN.02.01** Measure lengths in meters, centimeters, inches, feet, and yards approximating to the nearest whole unit using abbreviations: cm, m, in, ft, yd.

**G.GS.02.03** Draw rectangles and triangles, and compute perimeters by adding lengths of sides, recognizing the meaning of perimeter.

**M.PS.02.02** Compare lengths; add and subtract lengths (no conversion of units).

### Understand the concept of area

**M.UN.02.03** Measure area using non-standard units to the nearest whole unit.

**M.TE.02.04** Find the area of a rectangle with whole number side lengths by covering with unit squares and counting, or by using a grid of unit squares; write the area as a product.

### Tell time and solve time problems

**M.UN.02.05** Using both A.M. and P.M., tell and write time from the clock face in 5 minute intervals and from digital clocks to the minute; include reading time: 9:15 as nine-fifteen and 9:50 as nine-fifty. Interpret time both as minutes after the hour and minutes before the next hour, e.g., 8:50 as eight-fifty and ten to nine. Show times by drawing hands on clock face.

**M.UN.02.06** Use the concept of duration of time, e.g., determine what time it will be half an hour from 10:15.

### Record, add and subtract money

**M.UN.02.07** Read and write amounts of money using decimal notations, e.g., $1.15.

**M.PS.02.08** Add and subtract money in mixed units, e.g., $2.50 + 60 cents and $5.75 - $3, but not $2.50 + $3.10.

### Read thermometers

**M.UN.02.09** Read temperature using the scale on a thermometer in degrees Fahrenheit.

### Solve measurement problems

**M.PS.02.10** Solve simple word problems involving length and money.

## GEOMETRY

### Identify and describe shapes

**G.GS.02.01** Identify, describe, and compare familiar two-dimensional and three-dimensional shapes such as triangles, rectangles, squares, circles, semi-circles, spheres and rectangular prisms.

**G.GS.02.02** Explore and predict the results of putting together and taking apart two-dimensional and three-dimensional shapes.

**G.GS.02.03** Draw rectangles and triangles, and compute perimeters by adding lengths of sides, recognizing the meaning of perimeter.

**G.GS.02.04** Distinguish between curves and straight lines and between curved surfaces and flat surfaces.

**G.SR.02.05** Classify familiar plane and solid objects, e.g., square, rectangle, rhombus, cube, pyramid, prism, cone, cylinder, and sphere, by common attributes such as shape, size, color, roundness, or number of corners and explain which attributes are being used for classification.

**G.TR.02.06** Recognize that shapes that have been slid, turned or flipped are the same shape, e.g., a square rotated 45° is still a square.

## Use coordinate systems

**G.LO.02.07** Find and name locations using simple coordinate systems such as maps and first quandrant grids.

## DATA AND PROBABILITY

## Create, interpret, and solve problems involving pictographs

**D.RE.02.01** Make pictographs using a scale representation, using scales where symbols equal more than one.

**D.RE.02.02** Read and interpret pictographs with scales, using scale factors of 2 and 3.

**D.RE.02.03** Solve problems using information in pictographs; include scales such as each ■ represents 2 apples; avoid ⬓ cases.